The ITS Professional Capacity Building Program

by Thomas F. Humphrey

"President Clinton has made education his number one priority. In transportation, we have always understood the need to master new skills. Today, we need to learn and relearn. We are moving toward an integrated transportation system. We need to understand all modes of transportation and work side-by-side with all members of the DOT family." --Rodney Slater, Secretary of Transportation

Throughout its history, the U.S. Department of Transportation (DOT) has recognized the need to elevate the knowledge, skills, and abilities of surface transportation professionals to advance new technologies and programs. In the 1950s, the Interstate Highway System required transportation agencies to acquire and develop new road-building and civil engineering skills. In the same decade, the Federal Aviation Administration retrained its staff to master new electronics and advanced information systems that improved air traffic safety and efficiency.

Today, DOT is again rising to the challenge to build professional capacity. This time, DOT is devising innovative training, education, and outreach programs to advance the deployment of intelligent transportation systems (ITS) infrastructure across the nation.

The introduction of ITS systems and technologies will expand the "business" focus of many public-sector surface transportation agencies from the building and expansion of physical infrastructure to include more intensive operation and management of existing infrastructure. This expansion of focus will fundamentally change the functions and routines of transportation professionals whose daily job is to support the flow of passengers and cargo across the nation.

In particular, ITS deployment will require skills that go beyond the borders of the traditional civil engineering knowledge of many of today's surface transportation professionals. ITS deployment rests upon a foundation of multidisciplinary knowledge, skills, and abilities. It requires expertise in information, communications, electronics, and automation technologies and systems integration. ITS deployment will also require unprecedented cooperation among public-sector agencies and between the public and private sectors, necessitating new skills in partnering, contracting, and negotiations.

Goals of the Professional Capacity Building Program

In March 1996, DOT and the Intelligent Transportation Society of America (ITS America) launched a five-year Professional Capacity Building (PCB) Program to support the national goal to deploy ITS infrastructure in the 75 largest metropolitan areas by 2005. The PCB Program has four primary objectives:

- Ensure that sufficient numbers of trained public transit, highway agency, and motor vehicle regulatory professionals are available to build, operate, and maintain an integrated, interoperable, and intermodal ITS infrastructure, particularly multimodal transportation management and traveler information services.

- Cultivate the next generation of transportation professionals to staff ongoing and future ITS deployments and operations, particularly by instilling interdisciplinary knowledge and skills.

- Increase the awareness of ITS benefits and deployment options among public-sector decision-makers and industry, particularly regarding interjurisdictional cooperation, public-private partnerships, and funding.

- Raise public awareness about ITS benefits and services to create informed transportation users.

DOT and ITS America guide the PCB Program in cooperation with a steering committee of prominent transportation professionals from government agencies, academic institutions, and the private sector; the commissioner of the Georgia DOT, Wayne Shackelford, serves as the chair.

The Need for ITS Professional Capacity

Since 1992, a series of studies, reports, conferences, and workshops have identified the need to develop a new "breed" of transportation professional to deploy ITS. This early research revealed four fundamental facts.

First, ITS deployment will require skills unfamiliar to today's cadre of transportation professionals. According to a survey conducted by the Institute of Traffic Engineers (ITE), 44 percent of the respondents working within local agencies judged their ability to operate and maintain advanced traffic management systems as fair or poor, and 35 percent of those same respondents stated that the lack of qualified technical and maintenance personnel was a severe or major problem. For state agencies, 50 percent of the respondents rated their ability to operate advanced systems as fair or poor, and 66 percent rated their ability to maintain such systems as fair or poor. Of these respondents, 71 percent felt that improved training would increase their ability to operate their systems, and 100 percent said improved training would increase their ability to maintain such systems.[1]

Second, trained ITS professionals do not currently exist in sufficient numbers to effectively support widespread ITS infrastructure deployment. ITS deployment will require more transportation professionals now and in the future. For example, according to ITE, about 550 new entrants to the professional ranks of public-sector traffic operations are needed annually to meet current requirements. An additional 300 to 500 annual entrants are also necessary to meet emerging needs such as ITS. The current curricula at many universities and colleges may be unable to provide these entrants with the requisite knowledge and skills. Notably, one report found that the "[Civil Engineering] baccalaureate candidate has been exposed to an average of 4.6 credit hours in all transportation subjects. His/her exposure to traffic operations principles and applications can be, literally, zero!"[2]

Third, we need a deeper and more technical understanding of the requisite knowledge, skills, and abilities needed for ITS deployment. ITS deployment encompasses a broad range of activities, including promoting general awareness of ITS infrastructure and its benefits; mainstreaming ITS projects within the transportation planning process; developing regional frameworks that are rooted in the national ITS architecture; and installing, operating, and maintaining ITS infrastructure.[3] We need a comprehensive and systematic method for understanding what unique knowledge, skills, and abilities are required for each stage of ITS deployment and by which particular agencies. We must then develop appropriate education, training, and outreach programs to build professional capacity.

Fourth, we must determine and understand the best methods to deliver ITS training, education, and outreach programs. There are already existing ITS courses, which have been developed by federal agencies and associated training institutes such as the National Highway Institute and the National Transit Institute, state agencies, universities and colleges, and professional organizations. The PCB Program is determining how these courses could more keenly serve ITS deployment needs. In addition, course development and delivery of both new and existing courses must surmount practical obstacles to learning. An ITE report, for example, identified five critical reasons why transportation staff do not receive adequate training: heavy workload, unavailable funding, long duration of courses, inconvenient place of training, and inconvenient scheduling of courses. Thus, new delivery media such as distance learning, interactive CD-ROM, and other innovative technology-based programs must be pursued.

"Tracking" Professional Capacity

The PCB Program proposes to address professional capacity building needs within a framework that places targeted audiences into three tracks that focus the development and delivery of ITS training, education, and outreach programs.

As shown in the accompanying table, Track 1 targets existing transportation professionals and trained professionals from other fields -- including academic faculty and consultants working with public agencies -- whose expertise supports ITS. Track 2 advances the development of future transportation professionals and leaders, including students at universities, colleges, and technical and vocational schools. Track 3 builds the awareness of elected and appointed officials who have influence over transportation policies, especially concerning funding, land use, environmental protection, and quality of life. This track also raises the awareness of the traveling public, which benefits from ITS deployment. In

little more than a year, the program has made considerable progress in each track.

In Track 1, which addresses the current training needs within the federal ranks, as of the end of May 1997, DOT:

- Presented a one-day ITS Awareness Seminar in 11 DOT regional and in 21 Federal Highway Administration (FHWA) divisional locations. Approximately 800 individuals participated in these seminars. The number of participants will reach 1,500 by the end of fiscal year 1997.

- Prepared and piloted a four-day course titled "Integrating Intelligent Transportation Systems" in Washington, D.C., in June 1997. This course will be presented to about 400 state, regional, and local professionals by the end of the fiscal year.

- Developed a series of nine one-day technical guidance seminars and workshops targeting federal, state and local ITS professionals. In cooperation with universities and professional associations, the PCB Program will deliver 20 seminars to approximately 500 individuals in 1997. Two workshops on telecommunications have already been presented and are now available to interested states and localities.

In Track 2, which promotes the development of future transportation professionals, we:

- Coordinated with the National Transit Institute (NTI) to develop ITS technology training for the transit industry.

- Launched programs with universities to assess educational needs and design model courses and curricula.

In Track 3, which aims to increase the awareness of public decision-makers, we:

- Developed and delivered Executive Scanning Tours and Reviews, which allowed high-level public-sector officials, legislators, and industry senior executives to view ITS deployments first-hand.

- Developed an Intelligent Transportation Infrastructure "Toolbox" for FHWA and Federal Transit Administration field offices.

Going Forward

Building the professional capacity needed to support deployment of ITS infrastructure is and will continue to be a priority for DOT.[4] Going forward, the PCB Program will be needs-driven -- continuously assessing training, education, and outreach needs. It will develop and offer training and educational programs to meet current and future demands. And it will infuse ITS into the mainstream thinking of government, industry, and academia. Also in the future, the PCB Program will expand to address the professional capacity needed to support rural ITS infrastructure and commercial vehicle information systems and networks (CVISN).

As it has done in the past, DOT will ensure that transportation professionals, decision-makers, and travelers can support and effectively use the technologies and systems -- in this case, the new ITS infrastructure -- that will advance the safety, efficiency, and quality of the nation's surface transportation systems.

PCB Projects for Targeted Audiences

	Track 1 Current Professionals	Track 2 Future Leaders	Track 3 Deployment Decision-Makers
Program	Training and/or retraining of existing professionals	Facilitating the education of future transportation professionals	Public outreach
Objective	Continuing education and expansion of the trained pool of ITS practitioners	Facilitate the development of next generation of ITS leaders	Informed decision making for transportation and ITS
Substance	Seminars, workshops, short courses	Courses, programs, curricula	Public information
Audience	Federal, state, regional, local	Undergraduates, graduates, faculty	Public decision-makers, elected and appointed officials, pre-college students (K-12)
Media	Classroom, distance learning, CD-ROM, non-traditional forms, WWW	Various new media, traditional classrooms	WWW, PBS/television, literature, video
Delivery Organizations	DOT headquarters, National Highway Institute, National Transit Institute, Local Technical Assistance Program, DOT regions, divisions, technical/vocational schools, universities, private sector, professional associations	Universities, colleges, community colleges, technical schools	Professional associations, public technology companies, ITS America

References

1. *Urban Traffic Engineering Issues and Answers: Operations and Maintenance of Electronic Traffic Control Systems*, Institute of Traffic Engineers, Washington, D.C., 1995, pp. 12-14.

2. Carlton C. Robinson. *Traffic Operations Manpower: A Scoping Study of Educational Needs and Responses*, prepared for the National Highway Institute and the Federal Highway Administration, Oct. 15, 1994.

3. "Intelligent Transportation Infrastructure Deployment Strategy," draft white paper prepared by Apogee Research Inc. for the Department of Transportation's Intelligent Transportation Systems Joint Program Office, May 16, 1997, p. 6.

4. Tony Kane. "Professional Capacity Building for Intelligent Transportation Systems (ITS)," FHWA News, Federal Highway Administration, Washington, D.C., Spring 1997, p. 1.

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